



mo370026  
cc: Tom  
Task ID# 4959  
Denison Mines (USA) Corp.  
1050 17th Street, Suite 950  
Denver, CO 80265  
USA

Tel : 303 628-7798  
Fax : 303 389-4125

www.denisonmines.com

July 12, 2012

Paul Baker  
Utah Division of Oil, Gas and Mining  
1594 West North Temple, Suite 1210  
PO Box 145801  
Salt Lake City, Utah 84114-5801

Dear Mr. Baker:

**Re: Response to Comments on Amended Notice of Intention to Commence Large Mining Operations, Denison Mines (USA) Corp., La Sal Snowball Mine, M/037/0026, San Juan County, Utah.**

Enclosed please find Denison Mines (USA) Corp. ("Denison") responses to comments listed under the applicable Minerals Rule heading; per the request in your comment review comment letter dated March 12, 2012.

**105.3 - Drawings or Cross Sections (slopes, roads, pads, etc.)**

Comment #	Sheet/Page/Map/Table #	Comments	Initials	Review Action
	Figures 12-16	Label the slope angles with H:V such as 3H:1V	CW	Figures have been changed and are enclosed
	Figure 13	Label slope angles on the cross sections. The slope angles are variable so use the arrow to point to the maximum grade and label with *H:1V	CW	Figures have been changed and are enclosed

**R647-4-113 – Surety**

Comment #	Sheet/Page/Map/Table #	Comments	Initials	Review Action
1		For earthwork cost please either use the Demolition worksheet and modify as needed and use the unit cost of 31 23 16.32 3450 \$4.55/bcy. The rock pile has a volume of 45,458 cy. \$4.55/bcy x 45,458 bcy = \$206,833. (2009 Means costs.)	whw	The earthwork cost was revised using approach described under comment 2.

RECEIVED

JUL 13 2012

DIV. OF OIL, GAS & MINING

Comment #	Sheet/Page/Map/Table #	Comments	Initials	Review Action
2		If the Operator is going to use the worksheets based on equipment costs for grading then use 01 54 33 20 4360. The monthly rental rate is \$16,300/month assume 176 hours per month and the equipment cost is \$92.61/hr. Operating cost is \$95.30. The equipment overhead is 10%. Equipment cost is $(\$92.61/\text{hr} + \$95.30/\text{hr})(1.1) = \$206.70/\text{hr}$ . The labor rate is \$62.15/hr Eqmd. Total cost is $\$206.70 + \$62.15 = \$268.85/\text{hr}$ . Quantity is 45,458 cy production rate is 189 cy/hr $45,458 \text{ cy}/189 \text{ cy/hr} = 240.5 \text{ hrs}$ . $\$268.85/\text{hr} \times 240.5 \text{ hrs} = \$64,658$ (Means 2009 costs)	whw	The earthwork cost was revised using equipment rental rate, operating cost and labor rate obtained from RS Means Costworks 2012.
3		For the drainage costs please either use the Demolition worksheets and modify as needed and use the unit cost 31 23 16 13 0120 \$4.10/bcy $(93 \text{ bcy} \times \$4.10/\text{bcy} = \$381.30)$ 31 32 19 16 1500 \$2.70/sy $(1425 \text{ sy} \times \$4.10/\text{bcy} = \$5,842.50)$ 31 37 13 10 0100 \$60.00/lcy $(508 \text{ lcy} \times \$60.00/\text{lcy} = \$30,480)$ (Means 2009 costs)	whw	Drainage costs were revised using modified Demolition worksheet and unit costs obtained from RS Means Costworks 2012
4		If the Operator is going to use the worksheets based on equipment costs then use channel construction then use 01 54 20 0150. The monthly rental rate is \$5,600/month assume 176 hours/month $(\$5,600/\text{month} / 176 \text{ hours/month} = \$31.82/\text{hr})$ . Operating cost is \$36.90/hr, Overhead is 10%. Equipment cost is $(\$31.82/\text{hr} + \$36.90/\text{hr}) \times (1.10) = \$75.59/\text{hr}$ . The labor rate is \$62.15/hr Eqmd. Total cost is $\$75.59/\text{hr} + \$62.15/\text{hr} = \$137.74/\text{hr}$ . $93 \text{ bcy} / 50 \text{ bcy/hr} = 1.9 \text{ hrs}$ $\$137.74/\text{hr} \times 1.9 \text{ hr} = \$261.7$ $508 \text{ lcy} / 7.75 \text{ lcy/hr} = 65.5 \text{ hrs}$ $\$137.74/\text{hr} \times 65.5 \text{ hrs} = \$9,021.9$ (Means 2009 costs)	whw	The drainage costs were revised using modified Demolition worksheet.
5		The material cost for 31 37 13 10 0100 \$31/lcy add 10% overhead and profit then the cost would be \$34.1/lcy $\$34.1/\text{lcy} \times 508 \text{ lcy} = \$17,322.8$ (Means 2009 costs)	whw	The material cost for seeding were revised using RS Means Costworks 2012
6		The material cost for channel construction assumes that suitable material is not available on site and would have to be purchased off site. If suitable material is available on site then it would not need to be purchased.	whw	Agreed
7		The costs in the worksheets were from Means 2009. The Division used unit costs from 2009 Means as a comparison. Please use cost from 2012. The Division will provide those costs upon request.	whw	Unit costs were updated using RS Means Costworks 2012
8		The escalation rate for 2012 is 1.2%	whw	The escalation rate was changed to 1.2%

### **Replacement Pages**

Enclosed, please find two complete, clean copies of the NOI with added/revised Attachments O – Surety Estimate and Figures 12 through 16.



Denison appreciates the opportunity to work with you and your staff on this project and hopes that all comments are addressed to your satisfaction. Please feel free to contact me at 303.389.4136 or [cwoodward@denisonmines.com](mailto:cwoodward@denisonmines.com) with any additional questions or comments.

Yours very truly,

**DENISON MINES (USA) CORP.**

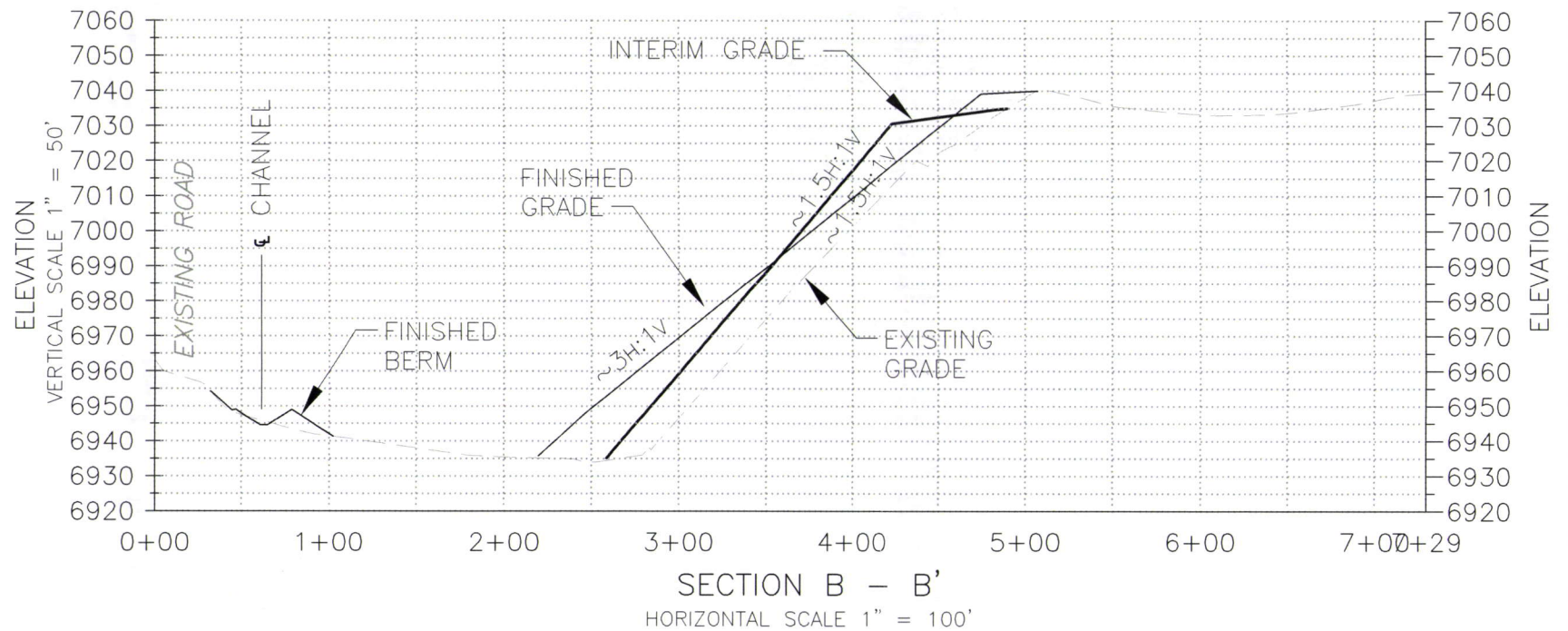
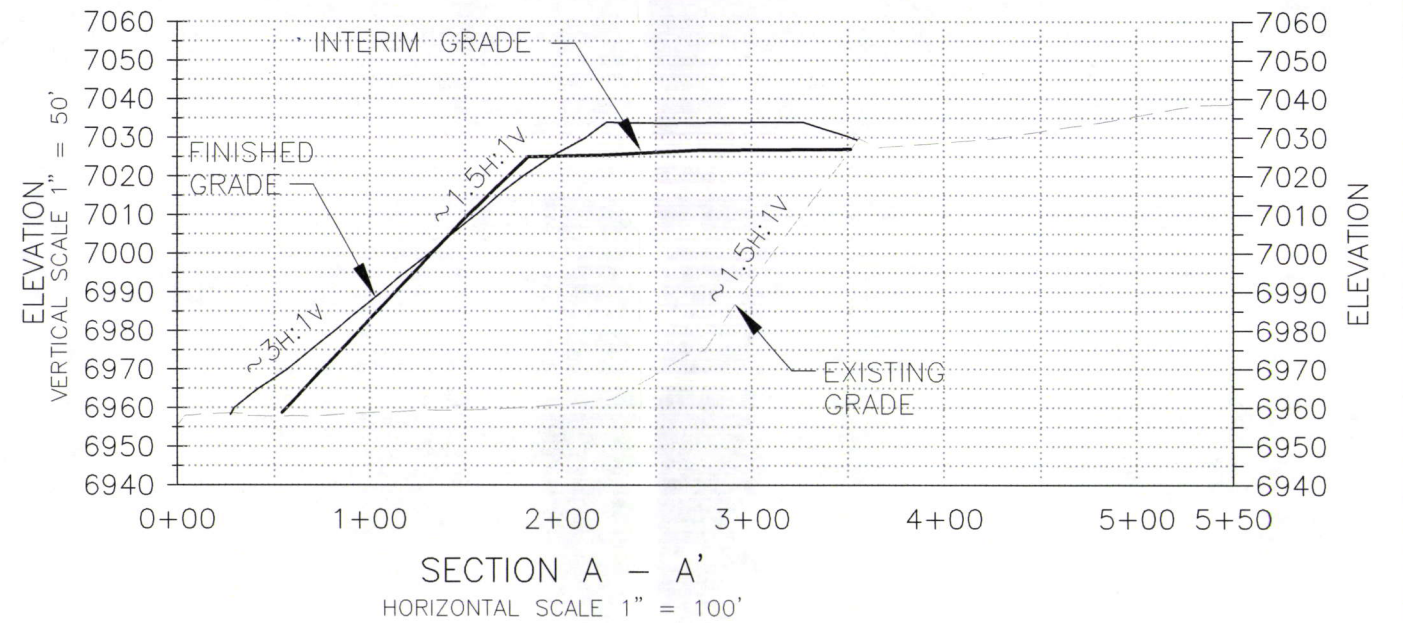
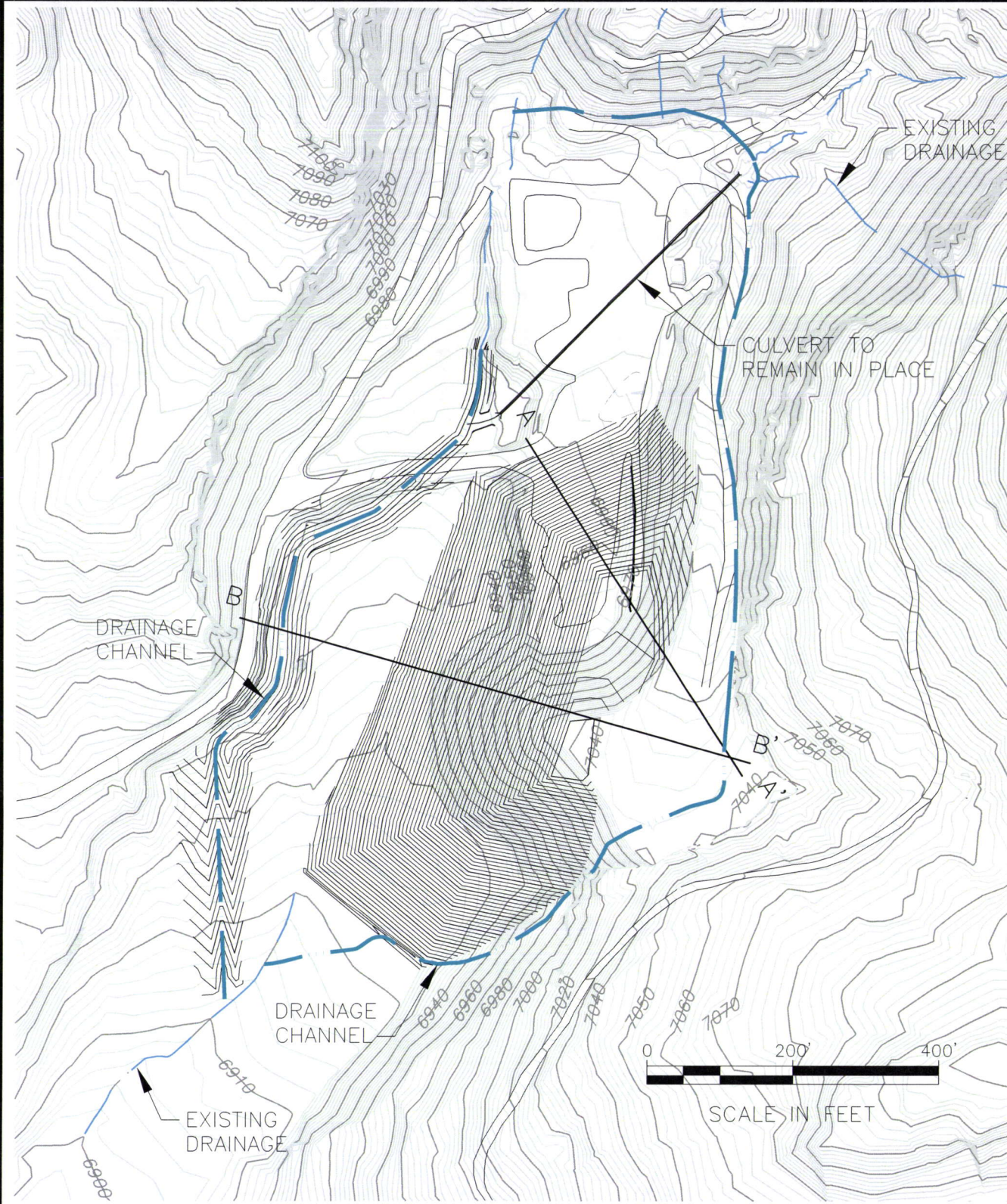


Christy Woodward, PE  
Environmental coordinator

Cc: Denison Mines (USA) Corp., File  
Terry Wetz, Philip Buck, Alex Morgan, Denison Mines (USA) Corp.  
Rebecca Doolittle, US Bureau of Land Management  
Joel Nowak, US Forest Service



W:\USAUTAHL\LaSal Complex\DWG\PERMITS\NOI\Fig 12 Pandora CDM.dwg Figure 12 GMoseley



FINAL GRADE AREA = 312,813 SQ. FT. (7.18 Ac.)

#### RECLAMATION NOTES:

1. ALL BUILDINGS ARE REMOVED AND DISPOSED OF OFF SITE OR PLACED IN UNDERGROUND WORKINGS.
2. ALL INCLINES, SHAFTS AND PORTALS ARE BACK FILLED, SEALED, GRADED AND SEEDED.
3. ALL IMMEDIATE MINE ACCESS ROADS ARE RE-GRADED, TILLED AND SEEDED WITH APPROVED SEED MIX.
4. MINE OPERATION SITES (PREVIOUSLY DISTURBED AREAS) WILL BE RE-GRADED, TILLED AND SEEDED WITH APPROVED SEED MIX.
5. SURFACE VENT AREAS AND POWER DROPS WILL BE SEALED AND DIFFUSERS WILL BE REMOVED AND APPROPRIATELY DISPOSED OF. DISTURBED AREAS AT VENTS WILL BE HAND BROADCAST SEEDED WITH APPROVED SEED MIX.

6. TOPSOIL (AS AVAILABLE) FROM STORAGE AREAS WILL BE PLACED OVER DISTURBED AREAS PRIOR TO SEEDING.
7. REMAINING ORE WILL BE HAULED OFFSITE OR PLACED UNDERGROUND.
8. WASTE ROCK AREAS WILL BE RE-GRADED (AS SHOWN), COVERED WITH TOPSOIL (AS AVAILABLE) TILLED AND SEEDED.

#### NOTE:

NO REQUESTS FOR VARIANCES EXIST AT THIS TIME.  
NO SLOPES WILL REMAIN STEEPER THAN 45 DEGREES.  
SLOPE ON RECLAIMED DEVELOPMENT ROCK AREA AT SURFACE FACILITY WILL BE NO GREATER THAN 3 HORIZONTAL: 1 VERTICAL.

#### VOLUME CALCULATIONS\*

SURFACE	CUT	FILL	NET FILL
EXISTING vs. FINISHED	55	238,363	238,308
INTERIM vs. FINISHED	36,033	35,459	574

\* ALL TABLE NUMBERS ARE IN BANK CUBIC YARDS (cy)

Denison Mines (USA) Corp **DENISON MINES**

REVISIONS		Project: <b>La Sal Mines Complex</b>	
Date	By	County: San Juan	State: UT
03-26-12	GM	Location: T 28-29 S, R 24-25 E (Portions)	

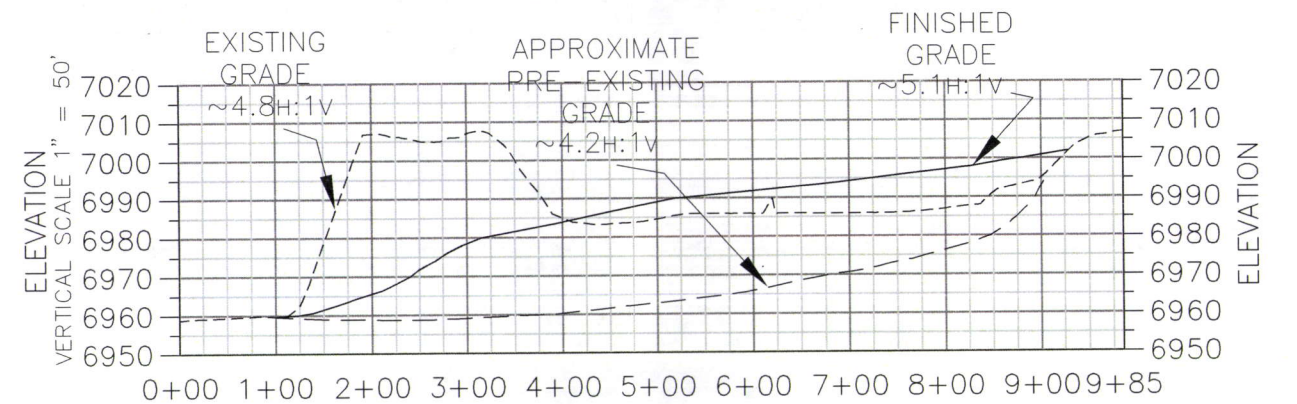
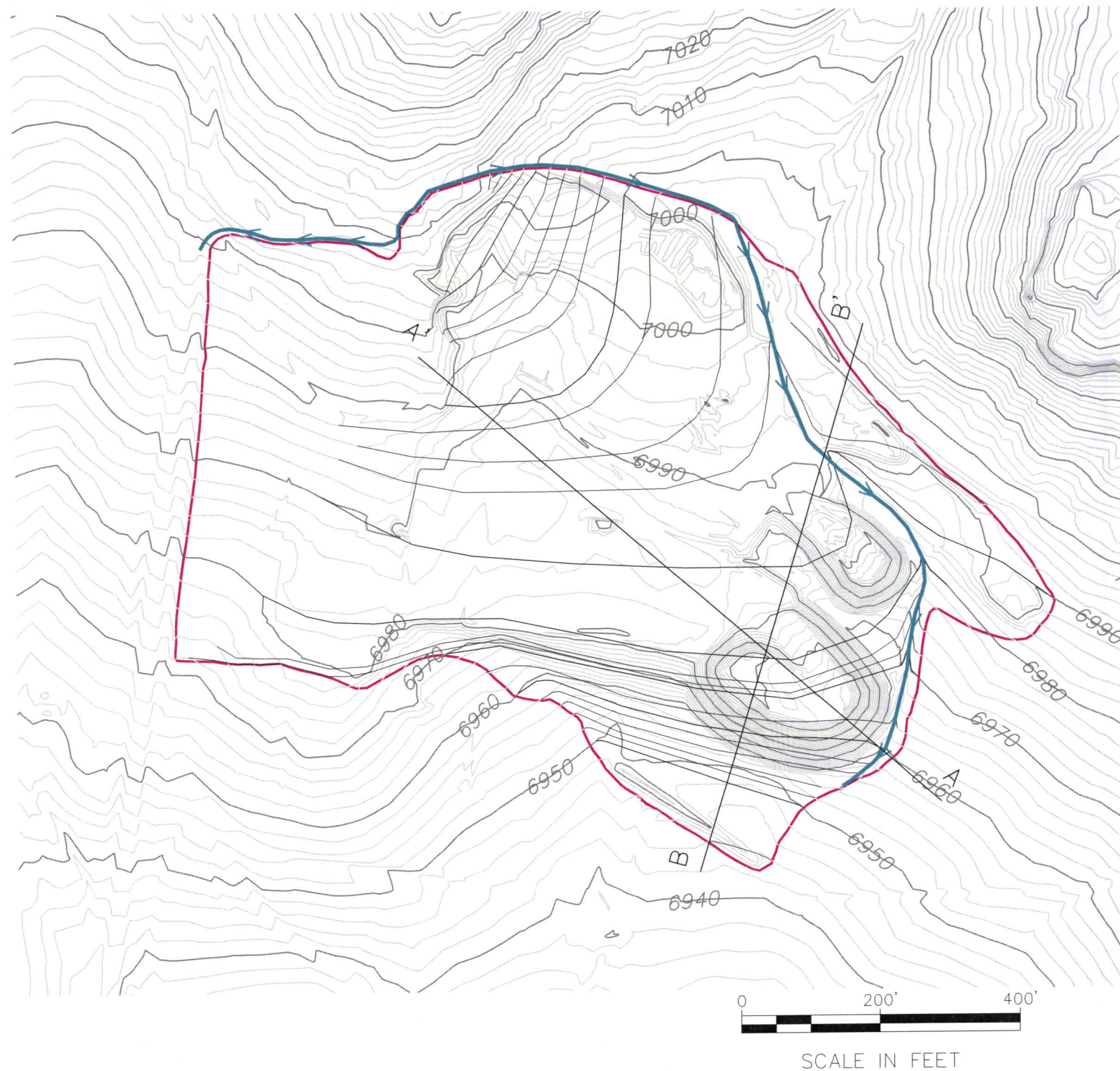
**NOI - FIGURE 12**  
**PANDORA MINE**  
**DEVELOPMENT ROCK PILE RECLAMATION**

UT83-SF

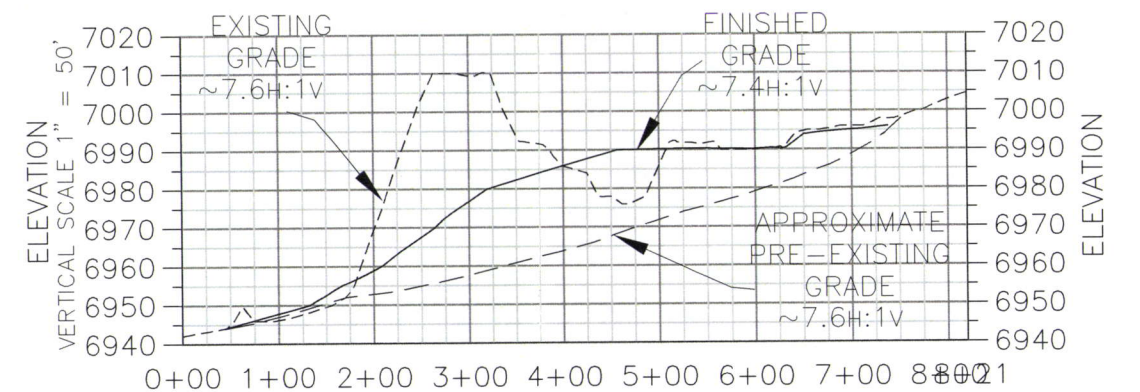
Author: CW Date: 10-26-2010 Drafted By: JLH



W:\USA\UTAH\LaSal Complex\DWG\PERMITS\NOI Fig 13 La Sal CDM.dwg NOI Fig 13 G Moseley



SECTION A - A'  
HORIZONTAL SCALE 1" = 200'



SECTION B - B'  
HORIZONTAL SCALE 1" = 200'

VOLUME CALCULATIONS*			
SURFACE	CUT	FILL	NET FILL
PRE-EXISTING vs. EXISTING	0	249,968	249,968
EXISTING vs. FINISHED	58,457	58,641	183

\* ALL TABLE NUMBERS ARE IN BANK CUBIC YARDS (cy)

FINAL GRADE AREA = 770,700 SQ. FT. (17.69 Ac.)  
TOPSOIL RECOVERY PILES = ±1,511 CUBIC YARDS


RECLAMATION NOTES:

- ALL BUILDINGS ARE REMOVED AND DISPOSED OF OFF SITE OR PLACED IN UNDERGROUND WORKINGS.
- ALL INCLINES, SHAFTS AND PORTALS ARE BACK FILLED, SEALED, GRADED AND SEEDED.
- ALL IMMEDIATE MINE ACCESS ROADS ARE RE-GRADED, TILLED AND SEEDED WITH APPROVED SEED MIX.
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- TOPSOIL (AS AVAILABLE) FROM STORAGE AREAS WILL BE PLACED OVER DISTURBED AREAS PRIOR TO SEEDING.

- REMAINING ORE WILL BE HAULED OFFSITE OR PLACED UNDERGROUND.
- WASTE ROCK AREAS WILL BE RE-GRADED (AS SHOWN), COVERED WITH TOPSOIL (AS AVAILABLE) TILLED AND SEEDED.

NOTE:

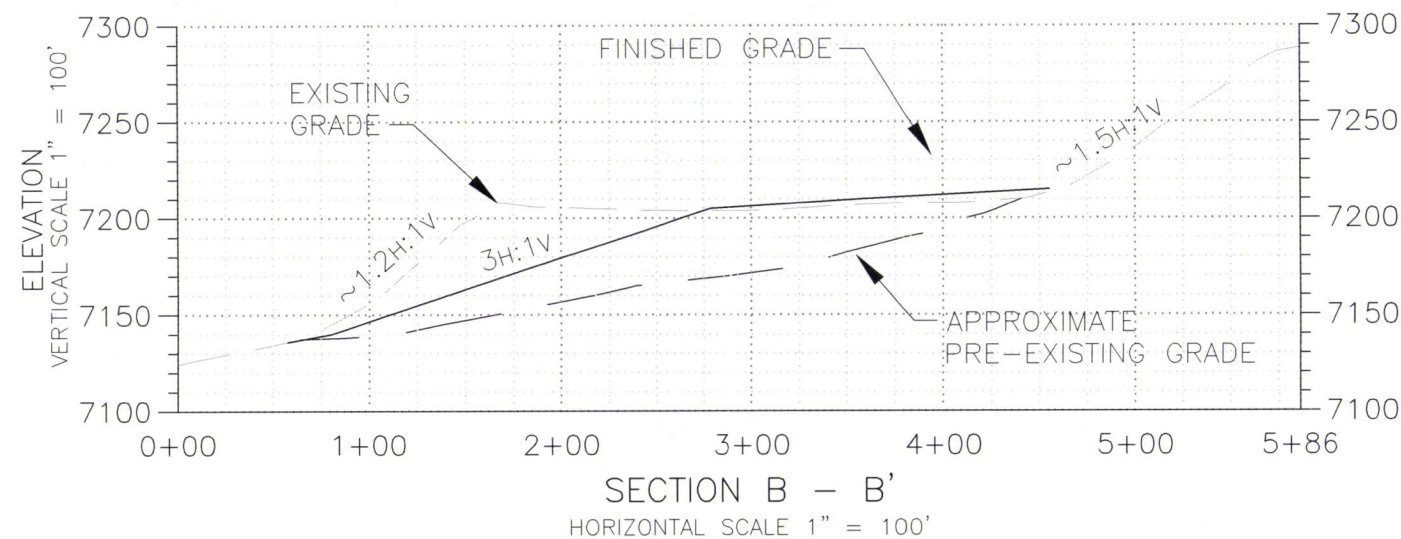
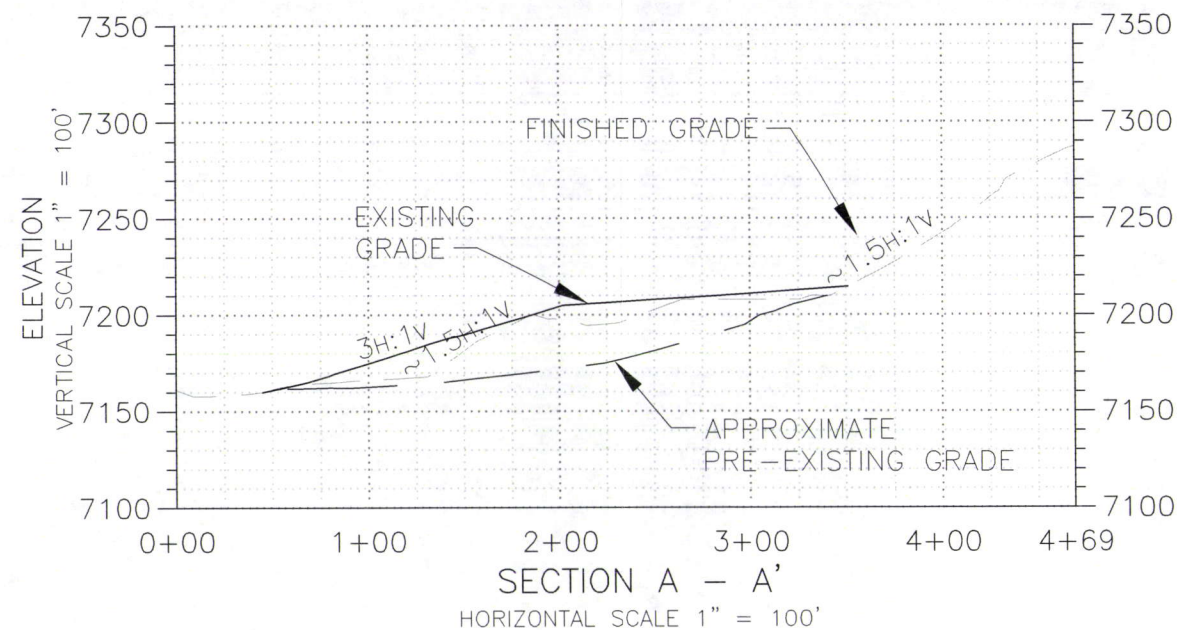
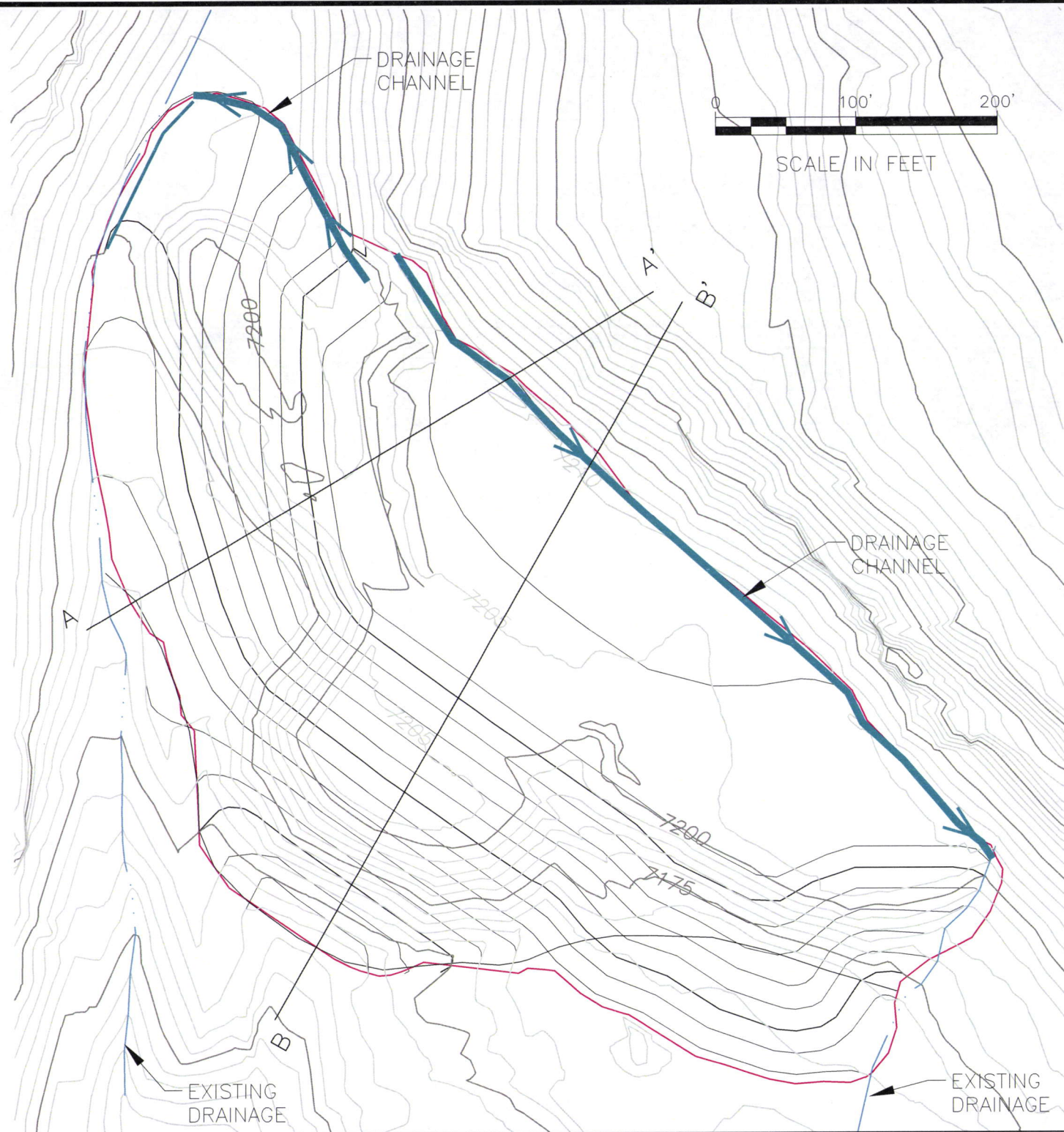
NO REQUESTS FOR VARIANCES EXIST AT THIS TIME.  
NO SLOPES WILL REMAIN STEEPER THAN 45 DEGREES.  
SLOPE ON RECLAIMED DEVELOPMENT ROCK AREA AT SURFACE FACILITY WILL BE NO GREATER THAN 3 HORIZONTAL: 1 VERTICAL.

Denison Mines (USA) Corp					
REVISIONS		Project: La Sal Mines Complex			
Date	By	County: San Juan	State: UT		
03-26-12	GM	Location: T 28-29 S, R 24-25 E (Portions)			
-	-	NOI - FIGURE 13 LA SAL MINE DEVELOPMENT ROCK PILE RECLAMATION			
-	-				
-	-				
-	-				
-	-				
Author: CW		Date: 1-13-2010	Drafted By: JLH		

UT83-SF



W:\USA\TAH\LaSal Complex\DWG\PERMITS\NOI Fig 14 Snowball CDM.dwg NOI Fig 14 G:\Moseley



FINAL GRADE AREA = 241,434 SQ. FT. (5.54 Ac.)

RECLAMATION NOTES:

1. ALL BUILDINGS ARE REMOVED AND DISPOSED OF OFF SITE OR PLACED IN UNDERGROUND WORKINGS.
2. ALL INCLINES, SHAFTS AND PORTALS ARE BACK FILLED, SEALED, GRADED AND SEED.
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8. WASTE ROCK AREAS WILL BE RE-GRADED (AS SHOWN), COVERED WITH TOPSOIL (AS AVAILABLE) TILLED AND SEED.

NOTE:

NO REQUESTS FOR VARIANCES EXIST AT THIS TIME. NO SLOPES WILL REMAIN STEEPER THAN 45 DEGREES. SLOPE ON RECLAIMED DEVELOPMENT ROCK AREA AT SURFACE FACILITY WILL BE NO GREATER THAN 3 HORIZONTAL: 1 VERTICAL.

VOLUME CALCULATIONS\*

SURFACE	CUT	FILL	NET FILL
PRE-EXISTING vs. EXISTING	0	132,768	132,768
EXISTING vs. FINISHED	33,194	33,197	3 FILL

\* ALL TABLE NUMBERS ARE IN BANK CUBIC YARDS (cy)

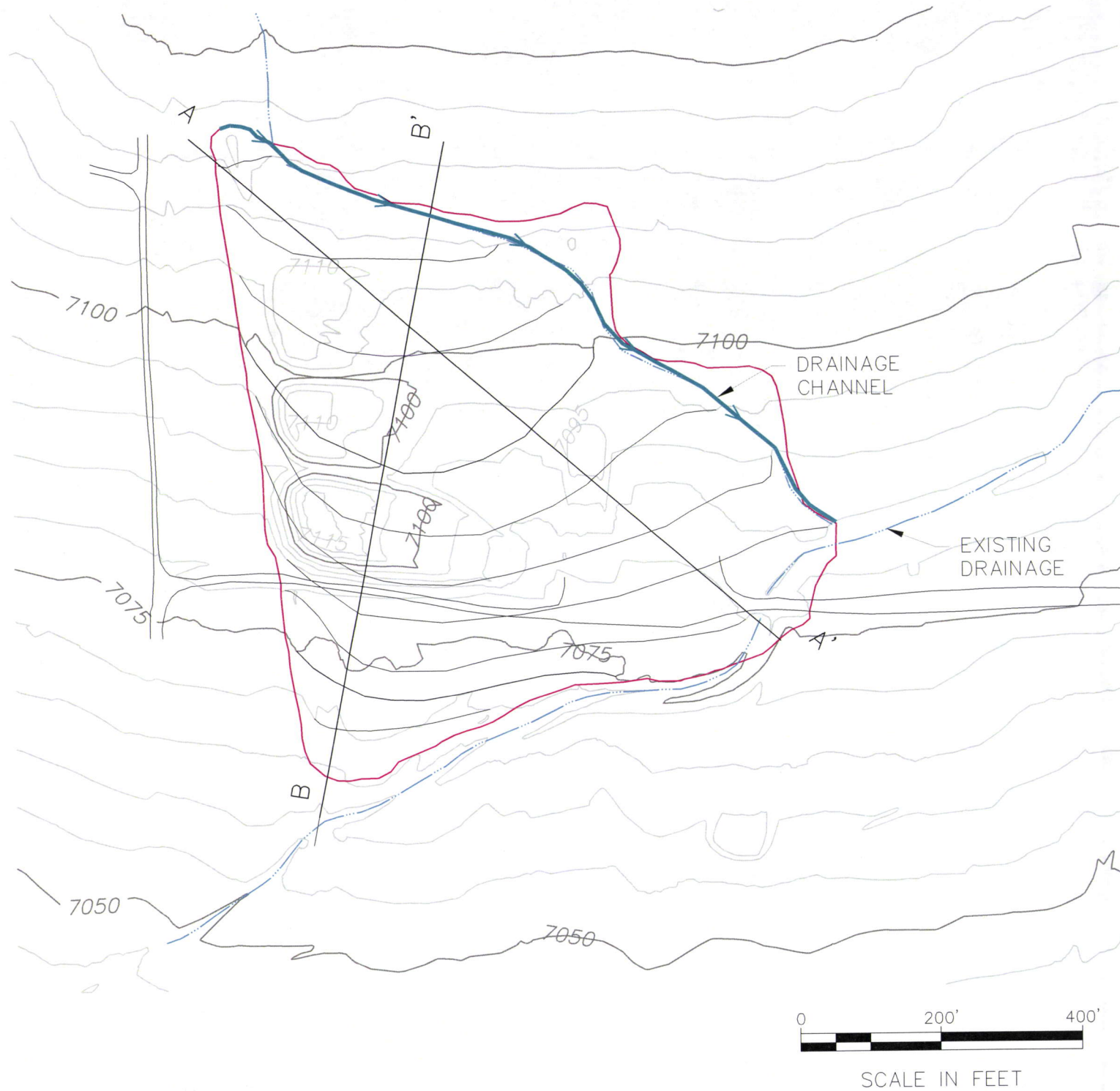
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Denison Mines (USA) Corp **DENISON MINES**

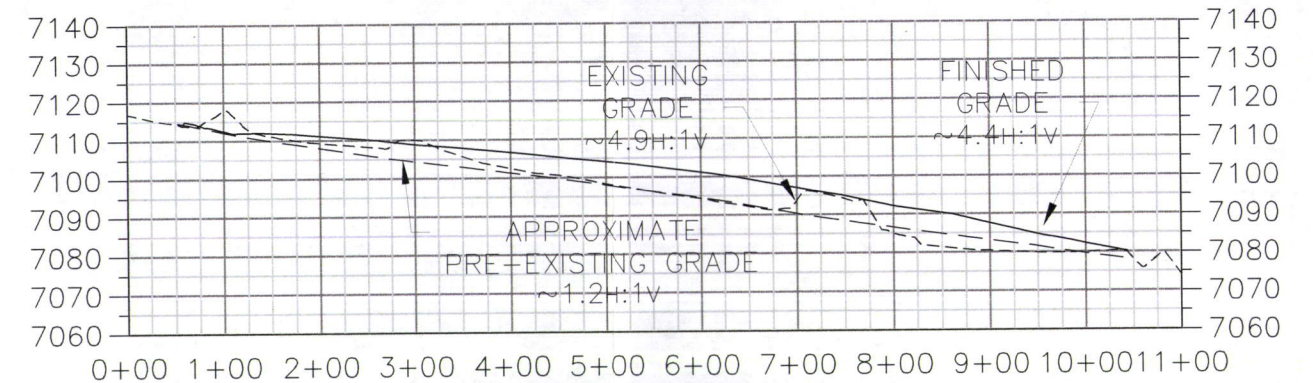
REVISIONS		Project: La Sal Mines Complex	
Date	By	County: San Juan	State: UT
03-26-12	GM	Location: T 28-29 S, R 24-25 E (Portions)	
		NOI - FIGURE 14 SNOWBALL MINE DEVELOPMENT ROCK PILE RECLAMATION	
		Author: CW	Date: 1-13-2010
		Drafted By: JLH	



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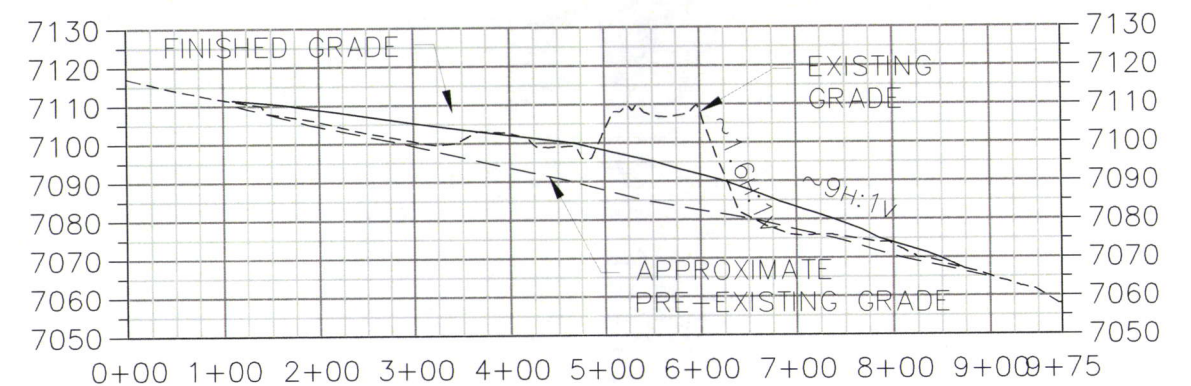


ELEVATION  
VERTICAL SCALE 1" = 50'



SECTION A - A'  
HORIZONTAL SCALE 1" = 200'

ELEVATION  
VERTICAL SCALE 1" = 50'



SECTION B - B'  
HORIZONTAL SCALE 1" = 200'

VOLUME CALCULATIONS*			
SURFACE	CUT	FILL	NET FILL
PRE-EXISTING vs. EXISTING	0	54,605	54,605
EXISTING vs. FINISHED	20,616	51,754	31,138
AVAILABLE FILL			31,138

\* ALL TABLE NUMBERS ARE IN BANK CUBIC YARDS (cy)

FINAL GRADE AREA = 428548 SQ. FT. (9.84 Ac.)

RECLAMATION NOTES:

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- WASTE ROCK AREAS WILL BE RE-GRADED (AS SHOWN), COVERED WITH TOPSOIL (AS AVAILABLE) TILLED AND SEEDED.

NOTE:

NO REQUESTS FOR VARIANCES EXIST AT THIS TIME.  
NO SLOPES WILL REMAIN STEEPER THAN 45 DEGREES.  
SLOPE ON RECLAIMED DEVELOPMENT ROCK AREA AT SURFACE FACILITY WILL BE NO GREATER THAN 3 HORIZONTAL: 1 VERTICAL.

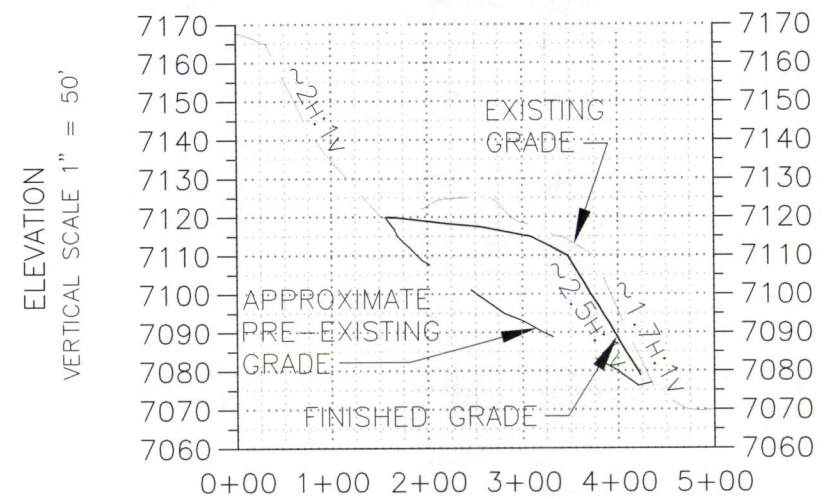
Denison Mines (USA) Corp **DENISON MINES**

REVISIONS		Project: La Sal Mines Complex	
Date	By	County: San Juan	State: UT
03-26-12	GM	Location: T 28-29 S, R 24-25 E (Portions)	
		NOI - FIGURE 15 BEAVER SHAFT WEST DEVELOPMENT ROCK PILE RECLAMATION	
		Author: CW	Date: 1-13-2010
		Drafted By: JLH	

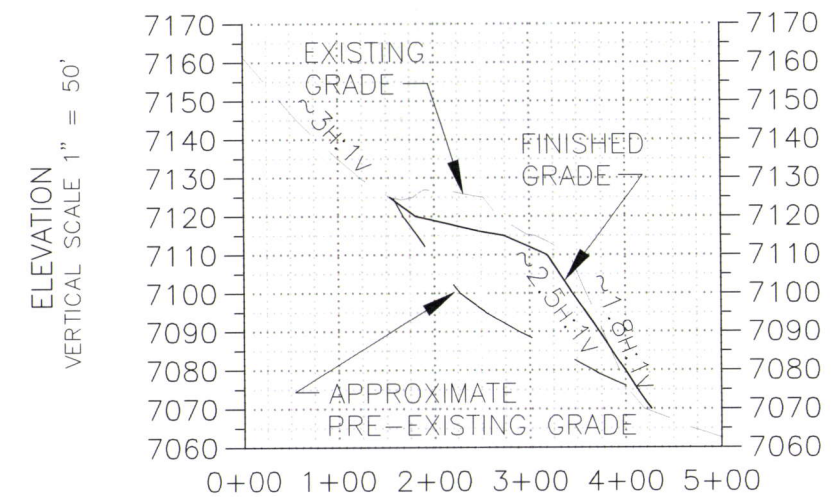
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SECTION A - A'  
HORIZONTAL SCALE 1" = 200'



SECTION B - B'  
HORIZONTAL SCALE 1" = 200'

FINAL GRADE AREA = 130,012 SQ. FT. (2.98 Ac.)

RECLAMATION NOTES:

1. ALL BUILDINGS ARE REMOVED AND DISPOSED OF OFF SITE OR PLACED IN UNDERGROUND WORKINGS.
2. ALL INCLINES, SHAFTS AND PORTALS ARE BACK FILLED, SEALED, GRADED AND SEEDED.
3. ALL IMMEDIATE MINE ACCESS ROADS ARE RE-GRADED, TILLED AND SEEDED WITH APPROVED SEED MIX.
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8. WASTE ROCK AREAS WILL BE RE-GRADED (AS SHOWN), COVERED WITH TOPSOIL (AS AVAILABLE) TILLED AND SEEDED.

NOTE:

NO REQUESTS FOR VARIANCES EXIST AT THIS TIME. NO SLOPES WILL REMAIN STEEPER THAN 45 DEGREES. SLOPE ON RECLAIMED DEVELOPMENT ROCK AREA AT SURFACE FACILITY WILL BE NO GREATER THAN 2.5 HORIZONTAL: 1 VERTICAL.

VOLUME CALCULATIONS\*

SURFACE	CUT	FILL	NET FILL
PRE-EXISTING vs. EXISTING	0	57,247	57,247
EXISTING vs. FINISHED	10,702	23,004	12,302
TOTAL TO BE RELOCATED			0

\* ALL TABLE NUMBERS ARE IN BANK CUBIC YARDS (cy)

Denison Mines (USA) Corp **DENISON MINES**

REVISIONS		Project: <b>La Sal Mines Complex</b>	
Date	By	County: San Juan	State: UT
03-26-12	GM	Location: T 28-29 S, R 24-25 E (Portions)	
		<b>NOI - FIGURE 16</b> <b>BEAVER SHAFT WEST</b> <b>DEVELOPMENT ROCK PILE RECLAMATION</b>	
		Author: CW	Date: 1-13-2010
		Drafted By: JLH	

UT83-SF



**PANDORA MINE  
RECLAMATION COST ESTIMATE AMENDMENT  
DENISON MINES (USA) CORP.  
LA SAL MINES COMPLEX  
SAN JUAN COUNTY, UTAH**

**Prepared for:  
DENISON MINES (USA) CORP.**



**Prepared by:  
CDM Smith Inc.  
555 17<sup>th</sup> Street, Suite 1100  
Denver, CO 80202**

**June 2012**



## **PURPOSE AND INTENDED USES**

The surety reclamation bond estimate was developed in an effort to provide Denison Mines with a cost estimate for determining the surety reclamation bond for the Pandora Mine in accordance with the Plan of Operations Amendment for the La Sal Mines Complex, San Juan County and UDOM Rule R647-4-113: Surety. This surety will replace the posted bond of \$175,811 for the Pandora Mine.

## **METHODOLOGY**

The bond estimate is divided into four areas of work: earthwork, drainage, demolition, and revegetation. Calculations and cost estimate spreadsheets are organized according to these four work areas. The cost estimate templates supplied by Utah Division of Oil, Gas, and Mining (UDOGM) were used to estimate the costs for each of the four categories. The costs are totalled on a cost summary sheet that applies indirect costs and escalation to the sum of the four areas of work to develop the overall surety reclamation bond estimate.

The estimate was developed using RS Means CostWorks 2012 unit costs; these costs were tailored for Utah through application of a state-specific adjustment factor. Unit costs derived from RS Means were not specifically adjusted for other site-specific considerations such as current fuel prices or prevailing labor wages.

## **SCOPE**

The bond estimate includes the following work scope activities, consistent with the Plan of Operations and Plan of Operations Amendment:

- Dismantle and removal of office building, shop buildings, trailers, and pump house building.
- Dismantle and removal of above ground water and fuel tanks.
- Removal and disposal of the onsite septic system
- Removal and disposal of utility poles and lines
- Dismantle and removal of generator and compressor
- Abandonment of the water well
- Removal and disposal of two 36-inch corrugated metal pipe (CMP) culverts from the Pandora Mine Access Road
- Removal and disposal of one 36-inch corrugated metal pipe (CMP) culvert from the Pandora Mine Site
- Construction of a riprap reinforced drainage channel from the Pandora Mine Site
- Regrade of approximately 36,000 cubic yards of development rock from a 1.5H:1V slope to an approximate 3H:1V slope
- Regrade and level the perimeter berms along the west boundary of the mine yard areas.
- Placement of excess ore into the portal
- Seal the portal with development rock
- Placement of stockpiled topsoil over the regraded development rock area (DRA) and mine yard area
- Rip and broadcast seeding with BLM-approved seed mixes of the impacted areas to establish vegetation



## **ASSUMPTIONS**

Several cost considerations have been identified that represent significant cost drivers. The following summarizes the general assumptions during development of the surety reclamation bond estimate:

- No overtime was assumed; working day was defined as an 8-hour day Monday through Friday excluding major holidays.
- The bond estimate is based on current (2012) dollars.
- The bond estimate assumes that all the necessary equipment, labor, and material will be locally available for the project.
- Crew assemblies will not vary from those selected.
- The indirect costs and the escalation factor of 1.2 percent for 3 years were obtained from the Third Review of Notice of Intention to Commence Large Mining Operation comments provided by the UDOGM. Depending on timing of award of construction contract, field mobilization and construction duration, costs due to escalation could vary.

The following site specific assumptions were made during development of the bond estimate:

- The two existing 36-inch CMP culverts from the Pandora Mine Access Road will be removed and can be disposed of onsite. However, the ditch will remain and soil will be bermed on either side of drainage channel to prevent anyone from driving over the access road.
- The existing 36-inch CMP culvert from the Pandora Mine Site will be removed and can be disposed of onsite.
- The riprap reinforced drainage channel from the Pandora Mine Site will be constructed along the alignment of the existing 36-inch CMP culvert.
- Existing soil stockpile is of sufficient volume to place a vegetative cover over the graded DRA.
- The graded surface of the DRA will be covered with topsoil from onsite sources, ripped and seeded by broadcasting.
- No compaction or compaction testing will be required.
- No watering or fertilizing of seeded areas will be required.

## **ACCURACY**

The costs presented in the bond estimate are considered Class 3 (Budget Authorization or Control) estimates with an accuracy range of +30%/-15% of estimated costs, according to the American Society for Testing and Materials (ASTM) Standard Classification for Cost Estimate Classification System (Designation E 2516-06). Class 3 estimates are generally supported by a discussion of the scope of the estimate and the uncertainties associated with each major cost item in the estimate. Special attention should be given to large cost items and items that are sensitive to change like equipment operating costs, materials costs or quantity estimates.



## **COST ESTIMATE TABLES AND CALCULATIONS**



## Bonding Calculations

## Direct Costs

Subtotal Demolition and Removal	\$33,843.74
Subtotal Drainage Improvements	\$49,662.15
Subtotal Backfilling and Grading	\$71,191.40
Subtotal Revegetation	\$112,387.50
<b>Subtotal Direct Costs</b>	<b>\$267,084.79</b>

## Indirect Costs

Contingency	\$26,708.00	10.0%
<b>Subtotal</b>	<b>\$293,792.79</b>	

Management	\$29,379.00	10.0%
<b>Subtotal</b>	<b>\$323,171.79</b>	

Total Cost 2012	\$323,171.79
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Escalation (1.2% every year for 3 years)	\$11,774.00
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Reclamation Cost Escalated	\$334,945.79
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Bond Amount (rounded to nearest \$1,000)	\$335,000.00
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Posted Bond	<b>\$175,811.00</b>
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Difference Between Cost Estimate and Bond	-\$159,189.00
Percent Difference	





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 JOB NO.: June 2012 Revision  
 CLIENT:

COMPUTED BY: DW  
 DATE: 6/5/2012

CHECKED BY: EB  
 DATE CHECKED: 6/5/2012  
 WRKSHT NO.: DEMO-01

**Description:** Calculations for demolition in support of the reclamation bond for the Pandora Mine.

#### Assumed Material Properties

Soil Bulking factor:	<b>1.2</b>	Conversion from BCY to LCY
Soil Compaction Factor:	<b>1.1</b>	Conversion from BCY to ECY
Soil Compaction Factor:	<b>0.9</b>	Conversion from LCY to ECY

#### Demo 2-36-inch Culvert from the Pandora Mine Access Road

##### Assumptions

- Assume culvert will be removed and not replaced
- Assume access road is no longer needed but existing drainage ditch will remain.
- Assume demolished material can be placed on development rock area
- Assume a trapezoidal volume for the base excavated portion and a triangular volume for the side portion
- Assume no other culverts will be removed
- Assume majority of excavated material surrounding culvert will be used to create berms on either side of drainage channel to prevent anyone from driving over the access road.
- Assume culvert will be corrugated metal pipe (CMP)

##### Calculations

Estimated top length of base excavation	40 FT	Estimated from pdf drawing
Estimated bottom length of base excavation	10 FT	Estimated from pdf drawing
Estimated depth of base excavation	6 FT	Estimated from pdf drawing
Estimated width of base excavation	12 FT	Estimated from pdf drawing
	1800 CF	
Estimated top length of side excavation	40	
Estimated bottom width of side excavation	12	
Estimated depth of side excavation	5	
Number of sides	2	
	1200 CF	
Estimated volume of cut	<b>112 BCY</b>	Rounded up to nearest whole number
Estimated buried length of culvert	70 LF	
Inside diameter of culvert	36 IN	
Outside diameter of culvert	45.5 IN	
Number of culverts	2 EA	
Estimated volume of culvert pipe	1582 CF	Rounded up to nearest whole number
	59 BCY	Rounded up to nearest whole number
Assumed crushed volume decrease	50%	
Estimated volume for haul	30 LCY	Rounded up to nearest whole number
Number of berms	2 EA	
Estimated width of berms on either side of ditch	12 FT	
Estimated height of berm	4 FT	
Estimated top length of berm	3 FT	
Slope of berm	3 H:1V	
Estimated bottom length of berm	27 FT	Rounded up to nearest whole number
Volume of berm	720 CF	Rounded up to nearest whole number
	27 BCY	Rounded up to nearest whole number
Total volume of berms	<b>54 BCY</b>	
Estimated volume remaining to be hauled off	<b>88 BCY</b>	
Estimated haul volume	<b>106 LCY</b>	Rounded up to nearest whole number
Estimated compaction volume	96 ECY	Rounded up to nearest whole number





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**Description:** Calculations for demolition in support of the reclamation bond for the Pandora Mine.

#### Demo 36-inch Culvert from the Pandora Mine Site

##### **Assumptions**

- Assume culvert will be removed and not replaced
- Assume demolished material can be placed on development rock area
- Assume a trapezoidal volume for the excavation of the culvert
- Assume drainage channel will be placed in same alignment as culvert

##### **Calculations**

Estimated length of culvert	465 FT	Estimated from pdf drawing
Number of culverts	1 EA	
Inside diameter of culvert	36 IN	
Outside diameter of culvert	45.5 IN	
Excavation side slopes:	2 :1	
Estimated cover on culvert	2 FT	
Estimated depth of culvert	5.8 FT	
Estimated bottom width of excavation	4 FT	
Estimated top width excavation	27.2 FT	Estimated from pdf drawing
	42073.2 CF	
Estimated volume of excavation	1559 BCY	Rounded up to nearest whole number
Estimated buried length of culvert	465 LF	
Inside diameter of culvert	36 IN	
Outside diameter of culvert	45.5 IN	
Number of culverts	1 EA	
Estimated volume of culvert pipe	5251 CF	Rounded up to nearest whole number
	195 BCY	Rounded up to nearest whole number
Assumed crushed volume decrease	75%	
Estimated volume for haul	147 LCY	Rounded up to nearest whole number
	123 BCY	
Estimated haul volume	147 LCY	Rounded up to nearest whole number
Estimated compaction volume	133 ECY	Rounded up to nearest whole number
Estimated volume for spreading excavated material	1364 BCY	





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**Description:** Calculations for demolition in support of the reclamation bond for the Pandora Mine.

#### Removal of Office and Dry

##### **Assumptions**

- Assume building will be dismantled
- Assume hauling costs are not part of this estimate

##### **Calculations**

Estimated Width of the building	30 FT	Estimated from pdf drawing
Estimated length of the building	60 FT	Estimated from pdf drawing
Estimated area of the building	1800 SF	

#### Removal of Two Shop Buildings

##### **Assumptions**

- Assume building will be dismantled
- Assume hauling costs are not part of this estimate

##### **Calculations**

Estimated Width of the building	35 FT	Estimated from pdf drawing
Estimated length of the building	60 FT	Estimated from pdf drawing
Estimated area of the building	2100 SF	

##### **Calculations**

Estimated Width of the building	25 FT	Estimated from pdf drawing
Estimated length of the building	30 FT	Estimated from pdf drawing
Estimated area of the building	750 SF	

Total Estimated area of the Buildings **2850 SF**

#### Removal of Three Trailers

##### **Assumptions**

- Assume building will be dismantled
- Assume hauling costs are not part of this estimate

##### **Calculations**

Estimated Width of the building	10 FT	Estimated from pdf drawing
Estimated length of the building	40 FT	Estimated from pdf drawing
Estimated area of the building	400 SF	
Number of Trailers	3	

Total Estimated area of the buildings **1200 SF**

#### Removal of Pump House Building

##### **Assumptions**

- Assume building will be dismantled
- Assume hauling costs are not part of this estimate

##### **Calculations**

Estimated Width of the building	10 FT	Estimated from pdf drawing
Estimated length of the building	10 FT	Estimated from pdf drawing
Estimated area of the building	100 SF	





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WRKSH T NO.: DEMO-01

**Description:** Calculations for demolition in support of the reclamation bond for the Pandora Mine.

#### **Removal of Above Ground Tanks**

##### **Assumptions**

- Assume tanks will be dismantled
- Assume hauling costs are not part of this estimate

##### **Calculations**

Number of Fuel Tanks	3 EA	Estimated from pdf drawing
Number of Water Tanks	2 EA	Estimated from pdf drawing
Total Number of Tanks	5 EA	

#### **Removal of Septic System**

##### **Assumptions**

- Assume septic tank is 2,000 gal precast tank
- Assume hauling costs are not part of this estimate

##### **Calculations**

Assumed tank length	9.7 FT
Assumed tank width	7.6 FT
Assumed tank height	7.08 FT
Estimated volume of excavation	520 CF
	20 BCY

Assumed excavation length	15 FT
Assumed excavation width	10 FT
Assumed excavation depth	6 FT
Estimated volume of excavation	900 CF
	34 BCY

#### **Removal of Utility Poles and Lines**

##### **Assumptions**

- Assume poles will be dismantled
- Assume hauling costs are not part of this estimate

##### **Calculations**

Number of Utility Poles	8 EA	Estimated from pdf drawing
Length of Above Ground Utility Line	1019 LF	Estimated from pdf drawing

#### **Abandonment of the Water Well**

##### **Calculations**

Diameter of the well:	0.375 FT	Costs Estimated per Local Driller
Depth of the well:	700 FT	

#### **Removal of Generators and Compressors**

##### **Calculations**

Number of Generators	1 EA	From NOI
Number of Compressors	1 EA	From NOI



## Pandora Mine

## Demolition Costs

Revised June 2012

Ref.	Description	Materials	Means Costworks 2012 Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
<b>Demo 2-30" CMP Culverts from the Pandora Mine Access Road</b>																				
	Excavating, bulk bank measure, 3.5 CY, hydraulic excavator, crawler mounted		31 23 16 42 0305	\$1.44	BCY						112					BCY	1	112	BCY	\$161.28
	Hauling, excavated, 22 CY truck, 5 MPH		31 23 23 20 5000	\$3.22	LCY						88					BCY	1.2	106	LCY	\$341.32
	Dozing material, 100' haul, 410 HP		31 23 16 32 3400	\$1.95	LCY						54					BCY	1.2	65	LCY	\$126.75
	<b>Subtotal</b>																			<b>\$629.35</b>
<b>Demo 36" CMP Culverts from the Pandora Mine Site</b>																				
	Excavating, bulk bank measure, 3.5 CY, hydraulic excavator, crawler mounted		31 23 16 42 0305	\$1.44	BCY						1559					BCY	1	1559	BCY	\$2,244.96
	Hauling, excavated, 22 CY truck, 5 MPH		31 23 23 20 5000	\$3.22	LCY						147					BCY	1.2	177	LCY	\$569.94
	Dozing material, 100' haul, 410 HP		31 23 16 32 3400	\$1.95	LCY						1364					BCY	1.2	1637	LCY	\$3,192.15
	<b>Subtotal</b>																			<b>\$6,007.05</b>
<b>Removal and Dismantle of Office and Dry (1 @ 60' x 30')</b>																				
	Selective Demo, pre-engineered steel bldg		13 05 05 50 0550	\$1.65	SF					1800						SF		1800	SF	\$2,970.00
	<b>Subtotal</b>																			<b>\$2,970.00</b>
<b>Removal and Dismantle of Shops (1 @ 60' x 35') and (1 @ 30' x 25')</b>																				
	Selective Demo, pre-engineered steel bldg		13 05 05 50 0550	\$1.65	SF					2850						SF		2850	SF	\$4,702.50
	<b>Subtotal</b>																			<b>\$4,702.50</b>
<b>Removal and Dismantle of Trailers (3 @ 40' x 10')</b>																				
	Selective Demo, pre-engineered steel bldg		13 05 05 50 0550	\$1.65	SF					1200						SF		1200	SF	\$1,980.00
	<b>Subtotal</b>																			<b>\$1,980.00</b>
<b>Removal and Dismantle of Pump House (1 @ 10' x 10')</b>																				
	Selective Demo, pre-engineered steel bldg		13 05 05 50 0550	\$1.65	SF					100						SF		100	SF	\$165.00
	<b>Subtotal</b>																			<b>\$165.00</b>
<b>Removal of Fuel and Water Tanks</b>																				
	Removal of a 563, 1033, 939 gal fuel tanks		13 05 05 75 0530	\$1,050	EA										3	EA		3	EA	\$3,150.00
	Removal of two water tanks		13 05 05 75 0530	\$1,050	EA										2	EA		2	EA	\$2,100.00
	<b>Subtotal</b>																			<b>\$5,250.00</b>
<b>Septic Tank Removal</b>																				
	Septic Tank, Precast, 2,000-2,500 Gal		02 41 13 44 0300	\$370	EA										1	EA		1	EA	\$370.00
	Distribution Box, Concrete, 7 outlets		02 41 13 44 1500	\$52	EA										1	EA		1	EA	\$52.00
	Leaching Chamber, Standard		02 41 13 44 1700	\$244	EA										1	EA		1	EA	\$244.00
	Leaching Pit, 6'-6"x8'		02 41 13 44 2300	\$455	EA										1	EA		1	EA	\$455.00
	Excavating, bulk bank measure, 3.5 CY, hydraulic excavator, crawler mounted		31 23 16 42 0305	\$1.40	BCY						34					BCY	1	34	BCY	\$47.60
	Dozing material, 300' haul		31 23 16 32 3450	\$5.35	BCY						34					BCY	1.2	41	LCY	\$219.35
	<b>Subtotal</b>																			<b>\$1,387.95</b>
<b>Removal and Dismantle Utility Lines and Poles</b>																				
	Utility Pole, Wood, 20-30' high		02 41 13 80 0100	\$262	EA										8	EA		8	EA	\$2,096.00
	Utility Wires (assumed 0.5 percent per LF)		NA	\$1	LF										1019	EA		1019	EA	\$1,334.89
	<b>Subtotal</b>																			<b>\$3,430.89</b>
<b>Water Well Abandonment</b>																				
	Abandonment of 700 foot Water Well		Local Driller Est. - Desert H2O Utah	\$5,000	EA										1	EA		1	EA	\$5,000.00
	<b>Subtotal</b>																			<b>\$5,000.00</b>
<b>Removal of Generators/Compressors</b>																				
	Compressor Removal		11 05 05 10 1410	\$171	EA										1	EA		1	EA	\$171.00
	Caterpillar Generator Removal		26 05 05 25 2100	\$2,150	EA										1	EA		1	EA	\$2,150.00
	<b>Subtotal</b>																			<b>\$2,321.00</b>
	<b>Total</b>																			<b>\$33,843.74</b>

BCY - bank cubic yard  
CY - cubic yard  
HP - horsepower  
LCY - loose cubic yard  
MPH - miles per hour





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WRKSHT NO.: DRAIN-01

**Description:** Earthwork calculations in support of the reclamation bond for the Pandora Mine.

#### Drainage Channel through the Pandora Mine Site

##### **Assumptions**

- Assume drainage channel will be placed in same alignment as the 36" CMP culvert
- Assume majority of excavation will be conducted during removal of the 36" CMP culvert

Shape:	Triangular
Side slopes:	2 :1
Finished Channel Height:	4 FT
Top width:	16 FT
Additional width on either side of channel	2 FT
Riprap channel length:	513 FT
General riprap depth:	12 IN
Specific riprap depth:	24 IN
Length of specific riprap depth:	3 FT
Riprap size. D50	8"

##### **Calculations**

Excavation depth for 1' deep riprap:	5 FT	
Area of channel excavation for 1' deep riprap:	54 SF	<i>Includes sides</i>
Additional excavation for 1' deep riprap:	45 LF	
Excavation depth for 2' deep riprap:	6 FT	
Area of channel excavation for 2' deep riprap:	80 SF	<i>Includes sides</i>
Additional excavation for 2' deep riprap:	3 LF	
Volume of excavation:	2508 CF	
	<b>93 BCY</b>	<i>Rounded up to nearest whole number</i>
	112 LCY	<i>Rounded up to nearest whole number</i>
Perimeter of channel:	25 LF	
Volume of riprap for 1' deep riprap:	12750 CF	
Volume of riprap for 2' deep riprap:	150 CF	
Total volume of rip rap:	12900 CF	
	478 ECY	<i>Rounded up to nearest whole number</i>
Total volume of rip rap:	<b>507 LCY</b>	<i>Rounded up to nearest whole number</i>
Density of rip rap, TN/CY:	1.5 TN/CY	
Weight of rip rap:	760.5 TN	



Ref.	Description	Means Costworks 2012 Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Material Cost	Cost
<b>Drainage Channel through the Pandora Mine Site</b>																				
	Excavating, trench or continuous footing, common earth, 1 C.Y. excavator, 4' deep	31231 613 0120	\$4.65	BCY						93					BCY	1	93	BCY	\$0.00	\$432.45
	Rip-rap and rock lining, random, broken stone, machine placed for slope protection	31371 310 0100	\$63.00	LCY						507					LCY	1	507	LCY	\$34.10	\$49,229.70
	<b>Total</b>																			<b>\$49,662.15</b>

BCY - bank cubic yard  
CY - cubic yard  
HP - horsepower  
LCY - loose cubic yard  
MPH - miles per hour





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WRKSHT NO.: EARTH-01

**Description:** Earthwork calculations in support of the reclamation bond for the Pandora Mine.

**Assumed Material Properties for Development Rock Material**

Soil Bulking factor:	1.2	Conversion from BCY to LCY
Soil Compaction Factor:	1.1	Conversion from BCY to ECY
Soil Compaction Factor:	0.9	Conversion from LCY to ECY

BCY - bank cubic yard - in place volume prior to excavation

LCY - loose cubic yards - volume after excavation

ECY - embankment cubic yards (aka compacted cubic yards) - volume after compaction

**Grade Development Rock Pile**

**Assumptions**

- Material will be pushed with a dozer to rough grade
- No fine grading of surface will be conducted

**Calculations**

Estimated volume of cut	36033 ECY	Based on CADD volume determination
Estimated haul volume	40037 LCY	Rounded up to nearest whole number

**Dozer Productivity Determination - 300' Push Distance, 410HP**

Hours per Shift, HR:	8	
Work Efficiency, %:	0.83	Assumes 50 minutes/hour
Slot Dozing Correction Factor:	1.20	
Visibility Correction Factor:	1.0	
Weight Correction Factor:	0.87	
Average Dozing Distance, FT:	300	

Work Efficiency	%	83%	
Operator Type		Average	
Operator Ability Correction Factor	Factor	0.75	
Grade		3 H:1V	
	% Slope	33%	
Grade Factor		1.6	Chart pg 1-45 CAT Handbook, Edition 31
Material Type		Rock	
Material Correction Factor	Factor	0.6	
Slot Dozing Correction Factor	Factor	1.20	
Visibility Correction Factor	Factor	1.0	
Weight Correction Factor	Factor	0.87	
Combined Prod. Correction Factor	Factor	0.63	
Ideal Dozer Productivity	LCY/HR	300.0	Chart on pg 1-42 CAT Handbook, Edition 31
Adjusted Dozer Productivity	LCY/HR	189.0	

**Grade Mine Yard Perimeter Berms**

**Assumptions**

- Material will be pushed with a dozer to rough grade
- No fine grading of surface will be conducted

Shape:	Triangular	
Side slopes:	1 :1	
Finished Channel Height:	2 FT	
Bottom width:	4 FT	
Estimated length of berms	600 FT	
Volume of excavation:	4800 CF	
	178 BCY	Rounded up to nearest whole number
	214 LCY	Rounded up to nearest whole number





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**Description:** Earthwork calculations in support of the reclamation bond for the Pandora Mine.

**Assumed Material Properties for Development Rock Material**

Soil Bulking factor:	1.2	Conversion from BCY to LCY
Soil Compaction Factor:	1.1	Conversion from BCY to ECY
Soil Compaction Factor:	0.9	Conversion from LCY to ECY

**Place Excess Ore Back Into Portal**

**Assumptions**

- Assumed 300 tons per day at site
- Assume at most 5 days of stored ore
- Assumed density of ore is 1.4 tons/cy

**Calculations**

Ore Generated Per Day	300 tons	Denison Operations Data
Number of Days Stockpiled	5 days	Denison Operations Data
Total Quantity of Ore Stockpiled on Site	1500 tons	
Assumed Density of Ore	1.275 tons/CY	pg 27-4 CAT Handbook, Edition 36
Total Volume of Ore Place Back into Portal	1177 CY	

**Seal Portal with Development Rock**

**Assumptions**

- Portal Adit is 10 feet by 10 feet
- Seal will extend 30 feet into the adit portal
- Outside seal will be sloped at 2H:1V

**Calculations**

Portal Height	10 FT	Field Data
Portal Width	10 FT	Field Data
Depth of Seal into Portal	30 FT	Reclamation Plan
Volume of Develop Rock to Seal Inner Portion	3000 CF	
	112 CY	
Slope of Outer Seal	2 :1	Reclamation Plan
2H:1V Outer Seal Slope Length	20 FT	
Front Slope Seal Volume	1000 CF	Triangular Wedge
Side Slope Seal Volume	1000 CF	Half Triangular Wedge by 2 sides
Volume of Develop Rock to Seal Outer Portion	2000 CF	
	75 CY	
Total Volume of Development Rock to Seal Portal	187 CY	



Description	Equipment Cost	Hourly Operating Costs	Total Equipment Cost	Operator's Hourly Wage Rate	Hourly Cost	Labor Hourly Wage Rate	Hourly Cost	Total Eq. & Lab. Costs	Units	Material Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost**	Means Costworks 2012 Reference Number
<b>Grade Rock Pile (1.5H:1V to 3H:1V)</b>																			
Dozing material, 300' haul, 410 HP	\$111.93	\$116.00	\$251	N/A	\$72.60	N/A	\$0.00	\$323.33	\$/HR	\$0.00	N/A	40,037	LCY	189	LCY/HR	N/A	N/A	\$68,491.87	0154 3320 4360
<b>Subtotal</b>																		<b>\$68,491.87</b>	
<b>Grade Development Berm (2' high at 1H:1V slope -600' long)</b>																			
Dozing material, 300' haul, 410 HP	\$111.93	\$116.00	\$251	N/A	\$72.60	N/A	\$0.00	\$323.33	\$/HR	\$0.00	N/A	214	LCY	189	LCY/HR	N/A	N/A	\$366.10	0154 3320 4360
<b>Subtotal</b>																		<b>\$366</b>	
<b>Place Excess Ore into Portal</b>																			
Dozing material, 300' haul, 410 HP	\$111.93	\$116.00	\$251	N/A	\$72.60	N/A	\$0.00	\$323.33	\$/HR	\$0.00	N/A	1,177	LCY	189	LCY/HR	N/A	N/A	\$2,013.52	0154 3320 4360
<b>Subtotal</b>																		<b>\$2,013.52</b>	
<b>Seal Portal with Development Rock (10x10'x30' deep)</b>																			
Dozing material, 300' haul, 410 HP	\$111.93	\$116.00	\$251	N/A	\$72.60	N/A	\$0.00	\$323.33	\$/HR	\$0.00	N/A	187	LCY	189	LCY/HR	N/A	N/A	\$319.91	0154 3320 4360
<b>Subtotal</b>																		<b>\$319.91</b>	
<b>Total</b>																		<b>\$71,191.40</b>	

\* Hourly rates include overhead and profit

\*\* Cost is rounded up to nearest \$0.01

N/A - information not available

LCY - loose cubic yard

HR - hour





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WRKSHT NO.: REVEG-01

**Description:** Calculations in support of the reclamation bond for the Pandora Mine.

#### Assumed Material Properties

Soil Bulking factor:	1.2	Conversion from BCY to LCY
Soil Compaction Factor:	1.1	Conversion from BCY to ECY
Soil Compaction Factor:	0.9	Conversion from LCY to ECY

#### Remove Stockpiled Topsoil and Spread

##### Assumptions

- Material will be moved with a hydraulic excavator
- Material will be spread with a dozer to rough grade. Dozer will provide some compaction to maintain slope.
- Assume existing soil stockpile will be removed and hauled to a nearby location for later use
- Assume soil stockpile has an area of 1.65 acres with an average thickness of 3 feet

##### Calculations

Area of soil stockpile	1.65 AC	Based on CADD volume determination
Assumed average depth of soil stockpile	3 FT	
Estimated soil stockpile volume	8000 BCY	Rounded up to nearest whole number
Estimated haul and spreading volume	9600 LCY	Rounded up to nearest whole number

#### Rip, and Seed

##### Assumptions

- Assumes surface of topsoil layer will be ripped
- Assumes broadcast with native seed will be applied over topsoil

##### Calculations

Estimated area of DRA for grading	7.18 AC	Based on CADD
	34752 SY	Rounded up to nearest whole number
	313 MSF	Rounded up to nearest whole number
Estimated depth for ripping	1 FT	
Volume for ripping	11593 BCY	Rounded up to nearest whole number
Estimated area of mine yard for grading	2.03 AC	Estimated from pdf drawing
	9826 SY	Rounded up to nearest whole number
	89 MSF	Rounded up to nearest whole number
Estimated depth for ripping	1 FT	
Volume for ripping	3297 BCY	Rounded up to nearest whole number
Total Area for Seeding	402 MSF	Rounded up to nearest whole number
Total Volume for Ripping	14890 MSF	Rounded up to nearest whole number



Ref.	Description	Materials	Means Costworks 2012 Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Unit	Swell Factor	Quantity	Unit	Cost
<b>Remove Stockpiled Topsoil and Spread</b>																
	Excavating, bulk bank measure, 3.5 CY, hydraulic excavator, crawler mounted		31231 642 0305	\$1.44	BCY						8000	BCY	1	8000	BCY	\$11,520.00
	Hauling, excavated, 22 CY truck, 5 MPH		31232 320 5000	\$3.22	LCY						8000	BCY	1.2	9600	LCY	\$30,912.00
	Dozing material, 100' haul, 410 HP		31231 632 3400	\$1.95	LCY						8000	BCY	1.2	9600	LCY	\$18,720.00
	<b>Subtotal</b>															<b>\$61,152.00</b>
<b>Ripping</b>																
	Soil preparation, ripping, 1' deep, dozer with single shank ripper		31231 632 2500	\$2.55	BCY						14890	BCY	1	14890	BCY	\$37,969.50
	<b>Subtotal</b>															<b>\$37,969.50</b>
<b>Seed</b>																
	Seeding, 0.45 pounds per MSF, tractor spreader	Seed	32921 914 0500	\$33.00	MSF					402		MSF	1	402	MSF	\$13,266.00
	<b>Subtotal</b>															<b>\$13,266.00</b>
	<b>Total</b>															<b>\$112,387.50</b>

BCY - bank cubic yard  
CY - cubic yard  
HP - horsepower  
LCY - loose cubic yard  
MPH - miles per hour  
MSF - 1,000 square feet  
SY -square yard